CLAIMS

1. Method of obtaining a gain function by means of an array of antennae and a weighting of the signals received or to be transmitted by vectors ($\bar{b}$) of N complex coefficients, referred to as weighting vectors, N being the number of antennae in the array, characterised in that, a reference gain function being given, the said reference gain function is projected orthogonally onto the sub-space of the gain functions generated by the said weighting vectors of the space of the gain functions, previously provided with a norm, and in that there is chosen, as the optimum weighting vector, a weighting vector generating the reference gain function thus projected.

2. Method of obtaining a reference gain function according to Claim 1, characterised in that the gain functions are represented by vectors ($\overline{G}$), referred to as gain vectors, of M complex samples taken at M distinct angles, defining sampling directions and belonging to the angular range covered by the array, the space of the gain functions then being the vector space C^M provided with the Euclidian norm, and in that, for a given frequency (f), the reference gain vector is projected onto the vector sub-space ($\mathrm{Im}f$) of the gain vectors generated by the array operating at the said frequency in order to obtain the said optimum weighting vector.

3. Method of obtaining a reference gain function according to Claim 2, characterised in that M is chosen such that $M>\pi N$.

4. Method of obtaining a reference gain function according to Claim 2 or 3, characterised in that the sampling angles are uniformly distributed in the angular range covered by the array.

5. Method of obtaining a reference gain function according to Claim 2, characterised in that the reference gain function is obtained by sampling the reference gain function after anti-aliasing filtering.

6. Method of obtaining a reference gain function according to one of Claims 2 to 5, characterised in that, the gain vectors ($\overline{G}$) being the transforms by a linear application (h_s^f) of $\mathbf{C}^N$ in $\mathbf{C}^M$ of the weighting vectors of the array and H_f being the matrix, of size MxN, of the said linear application of a starting base of $\mathbf{C}^N$ in an arrival base $\mathbf{C}^M$, the said optimum weighting vector, for a given frequency f, is obtained from the reference gain vector $\overline{G}$ as $\overline{b}=H_f^{\dagger}.\overline{G}$ where $H_f^{\dagger}=(H_f^{*T}.H_f)^{-1}.H_f^{*T}$ is the pseudo-inverse matrix of the matrix H_f and where H_f^{*T} is the conjugate transpose of the matrix H_f.

7. Method of obtaining a reference gain function according to Claim 6, characterised in that, the said starting base being that of the vectors $\overline{e_k}$, $k=0,\ldots,N-1$, such that $\overline{e_k}=(e_{k,0},e_{k,1},\ldots,e_{k,N-1})^T$ with $e_{k,i}=\exp(j.\frac{2\pi fd}{c}.i.\sin\theta_k)$ and $\theta_k=k\pi/N$ $k=-(N-1)/2,\ldots,0,\ldots,(N-1)/2$ and the arrival base being the canonical base, the matrix H_f has as its components: $H_{pq}=\exp(j(N-1)\Psi_{pq}/2).\frac{\sin(N\Psi_{pq}/2)}{\sin(\Psi_{pq}/2)}$ with $\Psi_{pq}=\pi\eta(\sin(p\pi/N)-\sin(q\pi/M))$ and $\eta=f/f_0$ with $f_0=c/2d$, d being the pitch of the array.

8. Method of obtaining a reference gain function according to Claim 6 or 7, characterised in that the reference gain vector is obtained by sampling the gain function generated at a first operating frequency f_1 of the array by means of a first weighting vector $\overline{b_1}$ and in that the optimum weighting gain vector for a second frequency f_2 is obtained by $\overline{b_2}=H_{f2}^{\dagger}.H_{f1}\overline{b_1}$.

9. Method of obtaining a reference gain function according to Claim 8, characterised in that the operating frequency f_1 of the array is the frequency of an uplink between a mobile terminal and a base station in a mobile telecommunication system and in that the operating frequency f_2 of the array is the frequency of a downlink between the said base station and the said mobile terminal.